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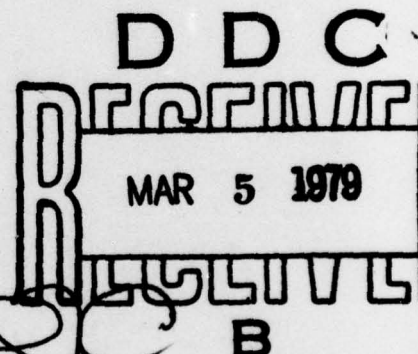31 JULY 1978   ACN 78078

ADAPTING ACADEMIC METHODS AND
MODELS TO GOVERNMENTAL NEEDS:
THE CIA EXPERIENCE

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⑨ Military issues research memos

⑥ ADAPTING ACADEMIC METHODS AND MODELS
TO GOVERMENTAL NEEDS: THE CIA EXPERIENCE ●

by

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⑩ Richards J. Heuer, Jr.

⑪ 31 July 1978

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FOREWORD

This memorandum was presented at the Military Policy Evaluation: Quantitative Applications workshop conference hosted by the Strategic Studies Institute in mid-1977. During the workshop, sponsored by DePaul University and the Strategic Studies Institute, academic and government experts presented the latest findings of formal models and statistical-mathematical approaches to the processes of military decisionmaking, assistance, intervention, and conflict resolution.

The Military Issues Research Memoranda program of the Strategic Studies Institute, US Army War College, provides a forum for the timely dissemination of analytical papers such as those presented at the workshop.

This memorandum is being published as a contribution to the field of national security research and study. The data and opinions presented are those of the author and in no way imply the indorsement of the College, the Department of the Army or the Department of Defense.

ROBERT G. YERKS
Major General, USA
Commandant

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BIOGRAPHICAL SKETCH OF THE AUTHOR

MR. RICHARDS J. HEUER, JR. is the Chief, Methods and Forecasting Division, Office of Regional and Political Analysis, Central Intelligence Agency. He has served in numerous positions during his 26 years with the Agency. Mr. Heuer holds a bachelor's degree in philosophy and earned a master's degree in international relations from the University of Southern California. He is the editor of the book *Quantitative Approaches to Political Intelligence: The CIA Experience,* (Westview Press, 1978).

ADAPTING ACADEMIC METHODS AND MODELS
TO GOVERNMENTAL NEEDS: THE CIA EXPERIENCE

In response to a policy directive by then CIA Director William Colby to experiment with the application of what are, for CIA, unconventional methods of political analysis, small methodology staffs were established in the summer and fall of 1973 in the two Central Intelligence Agency (CIA) offices dealing primarily with political analysis. Although CIA has been innovative in the application of new methodologies in other fields, e.g., economic modeling of Soviet defense expenditures, and information storage and retrieval, to name but two of many fields, the behavioral revolution in academic political science had been virtually ignored by the Agency and the intelligence community as a whole.

A reorganization in December 1976 combined the two methodology units and their parent offices into what is now the Methods and Forecasting Division of the Office of Regional and Political Analysis (ORPA). The Methods and Forecasting Division is charged with studying analytical techniques employed by academia and industry, and then testing, adapting and applying selected techniques to the needs of the political intelligence analyst. These are largely, but not exclusively, quantitative or computer-based procedures.

The product of the Division's efforts is disseminated in the same manner as other intelligence reports throughout the intelligence and foreign affairs community. It is in this respect unique within the community, for other quantitative political research for the State and Defense Departments, as well as for CIA, has normally been handled at the R&D level, i.e., contracted out, with the results usually enjoying greater dissemination and acceptance outside of government than within it. Neither State nor Defense has methodologists responsible for applying innovative techniques integrated into the day-by-day political intelligence production process, and even at CIA we have made only a small beginning.

The following section contains highly condensed, summary descriptions of the methodological projects undertaken to date; the descriptions include, whenever possible, references to studies which are unclassified and hence available to interested academic researchers. A subsequent section of this paper discusses lessons learned from three and half years of experience in trying to apply newer social science methods to political intelligence analysis. It seeks to answer the following questions. How and why do the Agency's political research objectives condition its methodological procedures? What kinds of methods and techniques seem particularly well suited to the Agency's needs? And how sucessful have we been in gaining recognition of the role of quantitative methods within an organizational culture that is and certainly must remain predominantly traditional in its political research methodology?[1]

DESCRIPTION OF PROJECTS

Bayesian Statistics: This has been used to estimate the likelihood of the initiation of a military conflict, for example, Arab-Israeli or Sino-Soviet conflict. Panels of area experts are asked at regular intervals to identify relevant items of evidence and then to estimate the conditional probability of each item of evidence occurring given each of a number of possible scenarios. The statistical Rule of Bayes is then used to calculate revised probabilities for each scenario.[2]

Elite Analysis: Age, education, political affiliation, career history, and a wide variety of other elite variables are coded and then analyzed by computer to test hypotheses concerning, for

example, the relationship between age and parliamentary voting pattern in a given country. The studies are usually conducted by the area divisions, with computer assistance from our staff.

Data Base Management: In addition to the elite studies data bases, we either maintain or assist in the maintenance of other computerized data bases. For example, we maintain a computerized file of UN General Assembly voting records. Further, a data base has been developed on all identifiable incidents of transnational terrorism, worldwide, from 1968 to 1975. There are approximately 600 incidents in the unclassified version, with 107 descriptive variables coded for each incident. The data base permits analysis of patterns of terrorist attacks according to geographic area, type of attack, type of perpetrator, goal, policy response, outcome, etc.[3]

Cross-Impact Analysis: This is a forecasting technique developed for industry rather than academia. It uses the subjective judgment of experts to identify and then estimate the probability of events that would have an impact on a given situation. The experts then estimate the relationship, or cross-impact, between each pair of events, and a computer traces the further cross-impacts to calculate the logical implications of the experts' judgments. First tested by us in an effort to forecast events in Rhodesia, the technique was very well received by the country analysts and seems to offer considerable promise as a systematic procedure for dealing with complex interactions.[4]

Content Analysis: The advantages and limitations of quantitative content analysis have been examined with particular reference to research on the Soviet Union. Elite analysis, perceptions analysis, measurement of political indicators, and psychological assessment of foreign leaders were identified as specific fields in which the systematic coding of textual characteristics might be useful.

Simulated Electoral Systems: Simple, computerized models of several electoral systems have been designed to take an analyst's estimates of changes in the percentage of votes to be obtained by various parties in different parts of the country, and translate these estimated changes in the voting pattern into their practical consequences for the number of seats each party will win in an upcoming election. A more complex election analysis model is now being developed.

Model of Political Violence: Gurr's (1970) model of political violence was modified slightly and operationalized using panels of country experts to estimate the values of eighteen variables for each significant political actor group in Thailand, Argentina and Ethiopia. Estimates were updated monthly for six months to determine if the model could predict changes in the potential for various types of political violence. Results were mixed, suggesting the need for considerable remodeling in future applications that may be considered.[5]

Multidimensional Scaling: A study utilizing multidimensional scaling examined the voting behavior of selected groups of nations in the United Nations during the 1975 General Assembly. The groups analyzed included formal bodies such as the OECD nations, as well as groups of third world, developed and Communist nations. The analysis compared the behavior of the groups across selected issue categories during each session.[6]

Analysis of Foreign Leaders: We have completed one study of a foreign leader using the operational code approach developed by Alexander George (1969). Analysts in the Agency's office responsible for routine biographic reporting are being encouraged, with some success, to incorporate concepts from the operational code into their regular reports. We are now experimenting with combining the psychoanalytical and operational code approaches to political personality assessment in order to provide a more fully rounded picture of how and to what extent a given foreign leader's personality characteristics influence his political attitudes and decisionmaking.

Other Techniques: Several political games, some with inter-Agency participation, were found to be useful in expanding the range of possible future events considered by analysts. In a half-day testing and training session, we tested analysts' ability to make subjective probability assessments, using a testing procedure (Brown,Kahr, and Peterson, 1974) which provides the analyst with feedback to improve his performance of such tasks. One experimental exercise using the pure Delphi technique has been run, and modified versions of the Delphi technique for eliciting and sharpening expert opinion have contributed to a number of other projects.[7] We are now looking at other group process techniques such as Nominal Group Technique (Delbecq, Van de Ven, and Gustafson, 1975). Cognitive mapping (Axelrod, 1976) also offers some promising applications which are currently being explored.

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LESSONS LEARNED

The application of Bayesian statistics to estimating the probability of military attack was our first major project, initiated in response to a specific suggestion from Mr. Colby. This and several other techniques were designed around a panel of experts, which meant gaining assistance from other analysts accustomed to traditional research procedures. Our early efforts benefited greatly from Mr. Colby's personal support, as the simple statement that the Director liked our work opened many doors—and minds. The initial attitude of country analysts toward our unconventional proposals typically ranged from skepticism to hostility. Equally typical, however, has been their post-project appraisal that the work was interesting and well worth doing.

Initial members of our office started by accepting the judgment of our critics that the Agency's approach to political analysis was antiquated, and that many useful techniques which had become routine in academia were being ignored by the intelligence community. But apart from the suggestion of Bayesian analysis, there was no guidance from above or consensus within the office on the precise directions which would be most fruitful. It was necessary, therefore, to take a broad look at the existing international relations data bases and theoretical models, as well as at specific analytical techniques. After some initial wheel-spinning, it soon became apparent that social scientists commonly define policy-relevant research far more broadly than the foreign policy community does, and that there were not a great many relevant methods and proven models just waiting for our use. We had to select from among many techniques those that were relevant to persistent problems of intelligence analysis, and we then had to adapt these methods to the specific problem context and to the requirements of a governmental organization producing reports, often on deadlines, to be read by policymakers rather then by academic scholars.

There are, of course, very many similarities between academic and governmental research. Both are trying to explain events, and to use a sound understanding of the past and present as a solid foundation for estimating the future. There are also significant differences, however. Some of these differences originate in different practical concerns, others reflect more fundamental

differences in perspective. The academic researcher is relatively free to define a problem in his own terms; our research problems are generally defined by the requirements of US foreign policy. The academic researcher chooses a topic for which he knows that data are available, whereas it is often new problems (or old problems definded in new ways) for which the policymaker requires intelligence analysis. The quantitatively oriented scholar can easily limit his work to those variables that can be operationalized, while the government foreign affairs analyst seldom enjoys that luxury; the issues he deals with are generally characterized by a large number of variables with complex and poorly understood relationships.[8] Further, the government analyst is far more concerned with matters of presentation. He is writing for an audience that, by and large, does not understand the procedures nor tolerate the jargon of social science methodology, and he must keep his presentation brief if he wants it read by persons in authority.

There are also more fundamental differences in perspective. The intelligence analyst is almost invariably concerned with the explanation and prediction of what he perceives as unique events, not with searching for general patterns of event. He must explain the military coup in Thailand in October 1976, and what this portends for the future stability of Thailand, not the correlates of domestic violence in general. Of course, theoretical propositions may contribute significantly to these explanations and estimates. The intelligence analyst uses explicit theory when he can, and it would certainly be helpful if more tested theoretical propositions at a level of specificity relevant to his concerns were available for his use, but he is generally not consciously concerned with trying to develop or prove theory; the country analyst views that as the task of academia, not government.[9]

Because of its focus on the seemingly unique event, most political intelligence analysis takes a different approach to the problem of probabilities than most academic analysis. The analyst relies primarily on subjective probability estimates rather than statistical probabilities. Bayesian analysis and cross-impact analysis both use subjective probability estimates, as did our operationalization of the Gurr model. Classical statistics requires that the analyst disregard the uniqueness of the individual case in order to focus on the uniformities in the mass of cases. Our

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political analysts are generally extremely reluctant to do this, as it forces them to ignore too much relevant information. The analyst's ideal is to know enough about the country for which he is responsible, enough about its leaders and its culture and problems, to be able to explain and evaluate events on the basis of the unique factors operative at that particular unique time and place. He tends to be skeptical of any form of simplification such as is inherent in the application of probabilistic models.

There are, of course, some problems for which some of the variables can be operationalized, with explicit hypotheses being formulated and then tested through statistical analysis of empirical data. We have done a limited amount of this, e.g., the elite analysis and content analysis studies and analysis of the data set on transnational terrorism, and it is satisfying to work with this hard data. There is doubtless much more that could be done if the time were available and the country analysts were trained to think in these terms, but even under the best of circumstances the application of classical statistics in political research would be far less common in our work that in academe.

Our work also differs from academia in the source of our quantitative data. For quantification we have relied heavily upon expert-generated data, rather than upon events data, survey data, or aggregated data on national attributes. Many of our projects involve a panel of experts who are asked to make quantitative judgments—to assign probabilities or values or ranks to items of information. CIA's greatest resource is its cadre of substantive analysts with first-class academic training who then come to the Agency and immerse themselves in a given specialty under circumstances which provide access to the full intelligence collection resources of the US Government. Our task is not to try to replace the subjective wisdom of these specialists with so-called objective data, but to use rigorous methodological procedures to explicate and exploit more fully the insights and judgment of these analysts.

Because of these many differences between our work and that of the academic researcher, our present tendency is to draw somewhat less inspiration from the quantitative research in political science and international relations, and somewhat more from the techniques of futures research, managerial decisionmaking, and policy analysis.

Because this paper focuses exclusively on methodologically oriented research, the reader might gain the impression that this is a major portion of the Agency's analytical effort. It isn't. It is only a very small part of the total political research effort, and it is bound to remain a small part. As long as intelligence research is directed toward answering questions such as what will happen in Yugoslavia after Tito's death, or what would be the consequences of Communist Party participation in the Italian government, the narrative essay will remain the dominant art form for intelligence estimates.

But there is an important role for rigorous procedures even in such complex estimative problems. Our work to date indicates that the kinds of analytical techniques which seem most useful for our purposes are those which help to trace the logical consequences of subjective judgments, extend the mental capacity of the individual analyst, force the analyst to make his assumptions explicit, or help to organize complexity. Group process techniques to structure interaction within a group of analysts working on a common problem are also useful. Probabilistic explanations grounded in classical statistical procedures are much less fundamental to our work than to academic research dealing with empirical theory.

We frequently ask ourselves how successful we have been in this endeavor. One conservative measure of success of any bureaucratic innovation is simple survival. Having survived a major reorganization, there is reason to feel we have been sufficiently successful to at least guarantee continued existence as an organizational entity responsible for furthering methodological innovation in political research. This certainly represents progress as compared with our tentative beginnings three and one-half years ago. And the distribution of our reports in hundreds of copies throughout the intelligence and foreign policy community serves as a periodic reminder to all recipients, including our own analysts, that the Agency's leadership is committed to experimenting with untraditional techniques of political analysis.

But the true test of success is not the reports we produce ourselves, but the extent to which we serve as a catalyst to change the attitudes and procedures of other analysts. In this respect our success has been more modest than we might hope, but nonetheless sufficient to encourage further pursuit of our goals.

In summary, this report has sought to make three principal

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points. First, that CIA is well aware that a different and more systematic approach, commonly referred to as the behavioral revolution, has transformed much academic international relations research during the past 15 years or so. Second, that the different goals of this approach—its emphasis on empirical theory and on the kinds of problems that can be quantified—place rather severe and intractable limits on its applicability to the needs of government agencies concerned with foreign affairs, since most of the variables of interest in connection with current foreign policy issues simply cannot be quantified. And finally, despite these limitations, that there is a role for more rigorous analysis in the Agency's political research, and that the Methods and Forecasting Division of the Office of Regional and Political Analysis is trying to define and help to fulfill that role.

ENDNOTES

1. A revised version of this paper, as well as CIA research reports that are referenced herein, appear in Richards J. Heuer, Jr., *Quantitative Approaches to Political Intelligence: The CIA Experience,* Boulder, Colorado: Westview Press, 1978.

2. For additional information, see the following: Nicholas Schweitzer, "Bayesian Analysis for Intelligence: Some Focus on the Middle East," paper presented to the 17th Annual Convention of the International Studies Association, Toronto, February 1976.

3. The terrorism data base is available to other researchers through the Inter-University Consortium for Political and Social Research, University of Michigan. The data base has been described and used in the following publication, David L. Milbank, *International and Transnational Terrorism: Diagnosis and Prognosis,* (CIA, Office of Political Research, PR-76 10030, April 1976); and the following articles by Edward F. Mickolus: "Negotiating for Hostages: A Policy Dilemma," *Orbis* 19,4, (Winter, 1976), pp. 1309-1325; "Statistical Approaches to the Study of Terrorism," in Seymour Maxwell Finger and Yonah Alexander, eds., *Terrorism: Multidisciplinary Approaches,* (New York: John Jay Press, forthcoming); "Transnational Terrorism," in Michael Stohl, ed., *Political Terrorism: A Reader in Theory and Practice,* (New York: Marcel Dekker, forthcoming); "Trends in Transnational Terrorism," in Marcus Livingston, ed., *Terrorism in the Contemporary World,* (Greenwood Press, forthcoming).

4. This project is reported in Frank Moritz, "Cross-Impact Analysis for Intelligence," paper presented to the 18th Annual Convention of the International Studies Association, St. Louis, Missouri, March 1977.

5. See Harold E. Dahlgren, *Profile of Violence: An Analytical Model,* (CIA, Office of Political Research, PR-76 10025, June 1976). Same paper presented to the 18th Annual Convention of the International Studies Association, St. Louis, Missouri, March 1977.

6. See Robin S. Kent and Winston P. Wiley, "Multidimensional Scaling of UN Voting Behavior," paper presented to the 18th Annual Convention of the International Studies Association, St. Louis, Missouri, March 1977.

7. See Nicholas Schweitzer, "Delphi as a Technique in Intelligence," paper presented to the 18th Annual Convention of the International Studies Association, St. Louis, Missouri, March 1977.

8. O'Leary *et al.,* (1974) conducted an empriical analysis of the types of variables and relationships analyzed by the State Department's Bureau of Intelligence Research (INR). They concluded that "Analyses found in INR documents tend to be of the most demanding kinds, involving multivariate analyses with many discrete variables, in which the relationships are frequently nonlinear and involve important time lags. As a matter of fact, the kinds of relationships found in the great majority of INR analyses represent such complexity that no single quantitative work in the social sciences could even begin to test their validity." (p. 228) CIA analysis is very similar to that done by INR.

9. Since theory is the basis for all explanation and prediction, the intelligence analyst is, in one sense, just as concerned with theory as the academician, the only difference being that the intelligence analyst normally does not make his theories

explicit so that they may be tested systematically and critiqued by others. This is, of course, true, but it glosses over very real differences in perspective between the researcher searching for patterns and the government analyst who focuses on individual events. While these two perspectives are complementary in theory, they tend to be contradictory in practice and to require different skills and methods. The principal differences concern the generality or specificity of the variables being studied. The variables studied by the quantitative scholar are usually too general and highly aggregated to be of use to the intelligence analyst. And the kinds of variables and relationships studied by the intellligence analyst are, as O'Leary *et al.*, (1974) discovered, usually so specific and so complex that they are not amenable to analysis with the currently available techniques of quantitative social science. Methodologists sometimes argue that the intelligence analyst is unable to operationalize his variables and then employ scientific methods only because he doesn't ask the right questions. If the analyst made his theory more explicit, at least some of the variables could be operationalized. The analyst, on the other hand, sees the methodologist as wanting to use a laborious procedure to deal with only a small part of the problem rather than with key issues. He feels the methodologist is trying to change the question in order to suit the question to the method, rather than fitting the method to the research problem. The country analyst generally has firm ideas about what questions he wants to answer, and what questions the policymaker or policy-support community wants answered, and if the methodologist cannot assist in answering *those* questions, then the methodologist is perceived as having little to offer.

BIBLIOGRAPHY

Axelrod, Robert., *Structure of Decision: The Cognitive Maps of Political Elites.* Princeton, New Jersey: Princeton University Press, 1976.

Brown, Rex V.; Kahr, Andrew S.; and Peterson, Cameron. *Decision Analysis for the Manager.* New York: Holt, Rinehart and Winston, 1974.

Delbecq, Andre L.; Van de Ven, Andrew H.; and Gustafson, David H. *Group Techniques for Program Planning: A Guide to Nominal Group and Delphi Processes.,* Glenview, Illinois: Scott, Foresman and Co., 1975.

George, Alexander L. "The 'Operational Code': A neglected Approach to the Study of Political Leaders and Decision Making." *International Studies Quarterly,* XII, 1969.

Gurr, Ted Robert., *Why Men Rebel.,* Princeton, New Jersey: Princeton University Press, 1970.

O'Leary, Michael K.; Coplin, William D.; Shapiro, Howard B.; and Dean, Dale. "The Quest for Relevance: Quantitative International Relations Research and Government Foreign Affairs Analysis, "*International Studies Quarterly,* 18 (June 1974): 211—238.

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This paper contains highly condensed, summary descriptions of methodological projects in political analyses undertaken by the CIA and discusses lessons learned in trying to apply social science methods to political intelligence analyses.